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Characteristics of Projects Funded Under the Farmers Home Administration's Water and Waste Water Disposal Program

Judith N. Collins

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ABSTRACT

The Farmers Home Administration has been a source of grants and low-cost loans for rural water and sewer facilities since 1965, and has made about 20,000 loans and 10,000 grants since then. A random sample of 327 projects funded in fiscal 1978 was studied to determine characteristics of FmHA-funded systems and communities served. Generally funds were used to build systems with fewer than 300 hookups and grants covered 40 percent of cost. FmHA tries to provide enough grant money so that debt service on the loan is 1 percent of family income. Average debt service relative to income did not significantly differ between communities; total user charges were significantly higher relative to income in poorer communities, however.

Keywords: Water, Waste disposal, Farmers Home Administration, Government aid, Loans, Distribution, Income, User cost.

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SUMMARY

The water and waste water disposal facility loan-grant program of the Farmers Home Administration (FmHA) of the U.S. Department of Agriculture is described and data on 327 projects funded by FmHA in fiscal 1978 are used to study characteristics of FmHA-funded systems and the communities served. In general, grants and loans went to build small systems (fewer than 300 hookups), and the grant portion of the funding covered 40 percent of the eligible project cost. The bulk of the grant and loan funds went to communities with median family incomes between \$4,000 and \$10,000, and resulted in user charges positively correlated with income. As a percentage of income, however, user charges were regressive, that is they consumed a greater portion of income at the lower income levels. Slightly more than half of the projects are in the South, which also received about half the total loan and grant funds. Average project size is largest in the South, as are per user costs relative to income.

One criterion that FmHA uses to decide the grant-loan split for funded projects is that the resulting debt burden per benefited user should be no more than one percent of income. Based on this sample of projects, mean debt service burden in the lower income communities (income less than \$6,000) was not significantly higher than in the wealthier communities and averaged one percent. Total user charges, which include debt costs, were significantly higher relative to income in the lower income communities, however. User charges ranged from less than one percent to 11 percent of income. Some of these extremes, as well as inequities in debt costs in individual cases, might be lessened if FmHA modified some of its other criteria for determining grant size.

CHARACTERISTICS OF PROJECTS FUNDED UNDER THE FARMERS HOME ADMINISTRATION'S WATER AND WASTE WATER DISPOSAL PROGRAM

Judith N. Collins*

INTRODUCTION

The purpose of this report is to provide a descriptive overview of water and waste water disposal systems funded in fiscal 1978 by the Farmers Home Administration (FmHA). The first section of the report describes the history and provisions of the FmHA water and waste water disposal loan-grant program. The second section describes selected characteristics of FmHA-financed systems and the communities served in fiscal 1978. These characteristics include size of the grant and loan, number of benefited users, cost per user, and cost as a percent of income. These characteristics are also used to assess whether the communities funded are able to obtain water and waste water disposal facilities at a reasonable cost. The final section presents some conclusion and implications.

FMHA'S WATER AND WASTE WATER DISPOSAL LOAN-GRANT PROGRAM

Since its creation in 1935 as the Resettlement Administration, a rural rehabilitation agency, the Farmers Home Administration has been a source of low-cost credit for many purposes including farm ownership, rural housing, and business and industrial development (for more detail, see 4). 1/ FmHA's part in providing water systems is almost as old as the original agency; the Water Facilities Act of 1937 provided loans for individual and association farm water systems in 17 western States where water shortages were common. The Resettlement Administration, the Soil Conservation Service, and the Bureau of Agricultural Economics jointly administered the act.

The act was amended in 1954 to include all States and to allow farm area water systems to take on nonfarm customers in rural communities. As part of the Consolidated Farmers Home Administration Act of 1961, the program was expanded to include the rural population as a whole, including incorporated towns of up to 2,500 population. With the passage of P.L. 89-240 in 1965, the program became a loan and grant program for both

*/ Economist; Economic Development Division; Economic Research Service; U.S. Department of Agriculture, Washington, D.C.

1/ Underlined numbers in parentheses refer to items in the Literature Cited section.

water systems and waste water disposal systems in rural towns of up to 5,000 population. Originally \$50 million in grants was authorized; this was increased to \$100 million in 1968. The Rural Development Act of 1972 increased grant authorization to \$300 million and also increased the population limit to 10,000. From fiscal 1966 to January 1980, FmHA obligated about \$5.6 billion in loan funds, \$1.66 billion in grant funds.^{2/}

FmHA's loan-grant program provides a combination of loan and grant funds to cover eligible construction and expansion costs ^{3/} for water and waste water disposal systems. Terms of the loan are often favorable. Until recently the interest rate was five percent on all loans. Under the provisions of the recently passed Omnibus Reconciliation Act of 1981 (P.L. 97-208), however, the interest rate equals the market rate of interest unless the project meets two conditions. First, construction or improvement must be necessary to comply with health standards, and second, median family income of the community must be at or below the poverty level. The interest rate on loans in these cases remains 5 percent. The repayment period varies, but is usually 40 years, and often repayment of principal is deferred for several years. The favorable terms of the loan increase the grant equivalent of the loan (²). That is, the more favorable the terms of the loan, the more the loan is like a grant. ^{4/}

Communities receiving funds must be unable to get commercial financing. Once FmHA has obligated funds, however, the community must obtain interim financing from a commercial source. The community receives the FmHA funds only when the project is nearly completed. These funds cover both principal and interest payments on the commercial loan.

Once FmHA has determined that a particular community is to receive funding, FmHA considers a number of factors to determine the split between loan and grant financing. One factor is debt

^{2/} The amount of funds actually obligated generally has been less than the total Congressional appropriation. The appropriation, in turn, is generally less than the total authorization.

^{3/} Eligible costs include those to install and improve domestic water and waste disposal facilities, to acquire land and rights, to construct or relocate buildings, fences, and secondary facilities, and to pay fees incidental to any of the preceeding activities. Grant funds may not be used to cover operation and maintenance costs, purchase existing systems, refinance existing indebtedness, or pay interest (⁵, Sec. 1823.472).

^{4/} For a more detailed discussion of the fiscal impacts of loans and grants, see (¹).

service as a percent of income; the general intent is to provide enough grant funds to keep this percentage between 0.75 percent and 1.25 percent. 5/ A second factor is the user charge of a "similar" system; FmHA tries to assure that the user charge is close to that of a "similar" system elsewhere, even if this means that the debt service as a percent of income would be greater than 0.75 to 1.25 percent. Third, FmHA tries to make grants only if the grant will lower user charges to below what they would be without the grant; a \$12 reduction per year is a rough guideline. Finally, a grant can not exceed 75 percent of the eligible project cost. 6/ Except for the 75 percent limit on grant funding, none of the preceding criteria are statutory requirements. In addition, decisions on the combination of loan and grant funds for projects are made by individual State offices, not a single office.

CHARACTERISTICS OF
FMHA-FINANCED
PROJECTS AND
COMMUNITIES SERVED

A random sample of 327 of the approximately 1,000 projects funded in fiscal 1978 was studied, using data from State FmHA offices.

General Character-
istics

FmHA-funded projects are diverse in many respects including number of benefited users, 7/ percent grant funding, user charges, and debt service per user (table 1). Project size ranged from 14 to 5,400 users and total grants ranged from \$4,000 to \$3,000,000. The grants covered from 0.7 percent to 50 percent of eligible costs, resulting in user charges from as little as \$24 per year to nearly \$700 per year.

5/ The percentage depends on community median family income as follows:

- If median family income is less than \$6,000, percentage = 0.75
- If median family income is \$6-10,000, percentage = 1.00.
- If median family income is greater than \$10,000, percentage = 1.25.

This sliding scale became effective in fiscal 1979. Before 1979 the percentage was one percent regardless of income (5, Sec. 1823.472). The one percent figure applies to the projects studied here.

6/ Before fiscal 1979, the maximum percentage was 50 percent. The 50 percent figure therefore applies to the projects studied here.

7/ 'Benefited users' refers to the number of residential hookups to the portion of the water or sewer system that is FmHA-financed. Hence, 'users' does not necessarily indicate size of the entire system.

Table 1--Characteristics of FmHA loans and grants, and communities served: water and sewer projects, fiscal 1978

Item	Characteristics														Hookups
	Total grant	Grant per user	Total loan	Loan per user	Median family income	Cost per user	Debt per user	Grant as per cent of eligible cost	Grant as per cent of total FmHA	Debt ser-vice as percent of user income	Debt ser-vice as percent of user income	User cost as per cent of income	Benefited users		
					(1979)										

1/ A zero loan does not indicate a non-funded project; rather it means that the project received grant funds only.

2/ Skewness measures the degree to which the distribution of observations around the mean is not symmetric. A positive value indicates that the distribution is skewed to the right of the mean; a negative value indicates that the distribution is skewed to the left of the mean.

Debt on FmHA loans as a percent of income, which FmHA tries to keep at one percent, actually ranged from zero (these projects received grant funds only) to 6.8 percent.

Differences between water and waste water disposal (sewer) projects are evident when the sample is disaggregated into water and sewer projects. Grants for water systems averaged \$290,000; loans averaged \$378,000 (table 2). Grants on average covered 44 percent of eligible costs and constituted 47 percent of the FmHA funding. Debt service accounted for a little over one-third of the \$162 user cost. Debt service as a percent of income averaged one percent, but was much higher (almost 7 percent) in some cases; total user charges averaged 2.6 percent of income.

The average grant and loan for sewer projects was larger than for water projects but the grant covered a smaller fraction of eligible costs (table 3). The split between grant and loan financing did not differ greatly between water and sewer projects, however; grants accounted for 42 percent of FmHA funding for water projects on average, 47 percent for sewer projects. User charges were slightly lower for sewer projects, and, since sewer projects were financed in higher income communities, user charges averaged two percent of income compared to 2.6 percent for water systems. Debt service accounted for a somewhat larger portion of the user charge (55 percent versus 37 percent); debt service as a percent of income averaged a little over one percent.

The 'typical' FmHA-financed project, located in a community with a median family income of about \$6,000, served fewer than 225 benefited users, or more than 900. A loan of less than \$100,000 resulted in a user cost of \$75 to \$150, of which debt service accounted for \$0 to \$100. The grant covered 45 to 50 percent of the eligible cost of the project, and users therefore devoted 0.5 to 1.5 percent of their income to debt service (table 4).

Loans and grants for water projects generally were typically less than \$100,000 each (table 5) while loans for sewer projects generally were at least \$100,000. Loans of \$100,000 or more for sewer projects were not uncommon (table 6). Compared to water projects, sewer projects received less grant funding relative to loan funding. Annual user charges and debt service were also generally higher, \$150 and \$50 per user, respectively. Debt service as a percent of income was at least one percent for over half of the sewer projects; for water projects debt service as a percent of income exceeded one percent in only about 25 percent of the cases.

Table 2--Characteristics of FmHA loans and grants, and communities served: water projects, fiscal 1978

Item	Characteristics														Hookups
	Total grant	Grant per user	Total loan	Loan per user	Median family income	Cost per user	Debt per user	Grant as eligible	Grant as per cent of FmHA	Debt ser-vice as percent of user income	Debt ser-vice as percent of user income	User cost as per cent of income	Benefited users		
Mean	290,674	933	378,104	1,058	6,424	162	63	43.9	46.7	37.2	1.0	2.6	432		
Minimum	4,000	17	0 1/	0	2,423	24	0	4.5	4.0	0.0	0	0.5	19		
Maximum	2,900,000	5,325	5,509,520	9,615	11,874	693	560	50.0	100	87.5	6.8	7.3	5,400		
Range	2,896,000	5,308	5,509,520	9,615	9,451	669	560	46.5	96.0	87.5	6.8	6.8	5,381		
Skewness 2/	3.338	1.948	4.394	3.545	0.322	2.776	3.425	-1.634	0.434	0.097	2.684	3.766	5,177		

1/ A zero minimum loan is not indicative of a non-funded project; rather it means that the project received grant funds only.

2/ Skewness measures the degree to which the distribution of observations around the mean is not symmetric. A positive value indicates that the distribution is skewed to the right of the mean; a negative value indicates that the distribution is skewed to the left of the mean.

Table 3--Characteristics of FmHA loans and grants, and communities served: sewer projects, fiscal 1978

Item	Characteristics													Hookups
	Total grant	Grant per user	Total loan	Loan per user	Median : family income : of ser-vice area:	Cost per user	Debt per user	Grant : as per-cent of : eligible : cost	Grant as : percent : of total : FmHA : funding	Debt ser-vice as : percent : of user : cost	User cost : as per-cent of : income	Benefited users		
Mean	361,679	1,155	574,988	1,440	7,886	155	88	29.8	41.8	54.9	1.1	2.0	498	
Minimum	4,300	14	0 1/	0	3,797	48	0	0.7	3.1	0.0	0	0.4	14	
Maximum	3,000,000	6,666	9,750,000	9,328	12,376	611	544	50.0	100	89.0	6.5	11.3	5,050	
Range	2,995,700	6,652	9,750,000	9,328	8,579	563	544	49.3	96.9	89.0	6.5	10.9	5,036	
Skewness 2/	3.232	2.421	6.908	5.448	-0.184	4.136	5.109	-0.112	0.407	-0.988	4.840	2.970	3.526	

1/ A zero minimum loan is not indicative of a non-funded project; rather it means that the project received grant funds only.

2/ Skewness measures the degree to which the distribution of observations around the mean is not symmetric. A positive value indicates that the distribution is skewed to the right of the mean; a negative value indicates that the distribution is skewed to the left of the mean.

Table 4--Characteristics of FmHA loans, grants, and communities served: water and sewer projects, fiscal 1978

Characteristic	: Common values	: Percent of projects	: Characteristic :	: Common values	: Percent of projects
Total loan	\$ 50,000-100,000 0- 50,000 100,000-150,000 1,000,000 and up	17.1 12.5 12.2 9.8	: :Median family :income : : :Number of bene- :fited users : : : :Annual cost per :user : :Cost per user :as percent of :income : :Annual debt :service per :User : :Debt service :as percent of :user cost : :Debt service :as percent of :income	\$ 6,000-8,000 4,000-6,000 8,000-10,000 75-150 150-225 900 and up 225-300 \$ 75-150 150-225 2-3 % 1-2 \$ 0-50 50-100 50 and up % 40-50 0-10 1-1.5 % 0-0.5 0.5-1.0	37.6 30.3 22.0 21.7 15.3 12.5 11.6 56.3 30.9 44.6 35.8 43.1 39.1 42.5 12.8 12.5 32.4 27.5 23.2
Loan per benefited user	\$ 600-800 0-200 1,200-1,400 1,400-1,600	11.6 11.3 10.7 10.4			
Total grant	\$ 0-50,000 50,000-100,000 100,000-150,000 150,000-200,000	17.7 16.8 11.6 11.0			
Grant per benefited user	\$ 0-200 200-400 600-800 400-600	16.5 13.8 13.1 11.0			
Grant as percent of eligible cost	45-50 % 30-45	59.3 17.4			
Grant as percent of total FmHA	40-50 % 50-60	50.5 11.6			

Table 5--Characteristics of FmHA loans, grants, and communities served: water projects, fiscal 1978

Characteristic	: Common	: Percent of	Characteristic	: Common	: Percent of
: values	: projects	:	: values	: projects	:
Total loan	\$ 50,000-100,000	20.2	:Median family	\$ 6,000-8,000	38.9
	0- 50,000	14.6	:income	4,000-6,000	36.0
	100,000-150,000	12.1	:	8,000-10,000	15.0
	150,000-200,000	10.1	:		
Loan per benefited	\$ 0-200	13.8	:Number of bene-	75-150	20.6
user	600-800	13.0	:fited users	150-225	16.2
	400-600	12.6	:	900 and up	13.4
	200-400	11.3	:	0-75	11.7
			:		
Total grant	\$ 50,000-100,000	19.4	:Annual cost per	\$ 75-150	57.1
	0-50,000	19.0	:user	150-225	27.9
	150,000-200,000	10.9	:		
	100,000-150,000	10.5	:		
			:		
Grant per bene-	\$ 0-200	19.0	:Cost per user	2-3 %	44.9
fited user	600-800	15.4	:as percent of	1-2	31.6
	200-400	13.8	:income		
	400-600	10.1	:		
			:Annual debt	\$ 0-50	52.2
			:service per user	50-100	33.6
			:		
Grant as percent	45-50 %	68.0	:Debt service	50 and up%	34.8
of eligible cost	30-45	16.6	:as percent of	20-30	15.8
			:user cost	0-10	15.4
			:		
Grant as percent	40-50 %	57.5	:Debt service	0-0.5%	34.0
of total FmHA	50-60	11.3	:as percent of	1.0-1.5	25.9
involvement			:income	0.5-1.0	22.7
			:		

Table 6--Characteristics of FmHA loans, grants, and communities served: sewer projects, fiscal 1978

Characteristic	: Common values	: Percent of projects	:	Characteristic	: Common values	: Percent of projects
Total loan	\$ 100,000-150,000	12.5	:	:Median family	\$8,000-10,000	43.8
	1,000,000 and up	12.5	:	:income	6,000-8,000	33.7
	250,000-300,000	8.7	:	:	4,000-6,000	12.5
	350,000-400,000	8.7	:	:		
Loan per	\$ 1,400-1,600	21.2	:	:Number of bene-	75-150	25.0
benefited user	1,200-1,400	13.7	:	:fited users	225-300	13.7
	1,000-1,200	12.5	:	:	150-225	12.5
	2,000 and up	11.2	:	:	300-375	10.0
			:	:	900 and up	10.0
			:	:		
Total grant	\$ 100,000-150,000	15.0	:	:Annual cost per	\$ 75-150	53.7
	0-50,000	15.7	:	:user	150-225	40.0
	150,000-200,000	11.2	:	:		
	250,000-300,000	10.0	:	:		
Grant per bene-	\$ 200-600	27.4	:	:Cost per user	1-2 %	48.7
fited user	2,000 and up	13.7	:	:as percent of	2-3	43.8
	0-200	8.7	:	:income		
	1,200-1,400	8.7	:	:		
Grant as percent	45-50 %	32.5	:	:Annual debt	\$ 50-100	56.3
of eligible cost	0-15	26.2	:	:service per user	100-150	25.0
			:	:		
Grant as percent	40-50 %	28.7	:	:Debt service	50 and up %	66.2
of total FmHA	20-30	16.2	:	:as percent of	40-50	20.0
involvement	50-60	12.5	:	:user cost		
			:	:		
			:	:Debt service	1.0-1.5 %	52.5
			:	:as percent of	0.5-1.0	25.0
			:	:income		
			:	:		

Regional Variations

Characteristics of FmHA-funded projects also vary between regions of the country (table 7). Slightly more than half of the projects, 52 percent, are in the South; this region also received almost half the grant and loans funds (49 percent and 46 percent respectively). Grants covered the largest portion of eligible project costs in the South and West. On a per user basis, however, projects funded in the the North Central States and Western States received the largest grants and loans, and total user charges were also highest for these projects. Higher construction costs in these regions may partially account for this. The average size of the projects was also smaller in these States. Actual user costs were considerably lower in the Southern states than in the North Central and Western States; relative to income, however, costs are about equal in the three regions. The debt burden was lowest in the South, however, averaging 67 to 75 percent of that in the North Central and Western States.

There are some interesting contrasts between water and sewer projects (tables 8 and 9). The South received the most grant and loan funds (58 and 61 percent of the total, respectively) for water projects; in contrast the bulk of the funding for sewer projects went to the Northeast and North Central States. These two regions received 82 percent of the total loan funds. The largest grants and loans per user for water projects went to the North Central region and the West, the largest grants for sewer projects went to the North Central region and the West; the largest per user grants for sewer projects went to the North Central region and the largest per user loans to the Northeast and North Central States. The pattern for user charges is similar to that for the entire sample, except that user charges for sewer projects were highest in the Northeast. The smallest water projects and the largest sewer projects on average were in the Northeast. User charges as a percent of income for sewer projects varied little between regions; for water projects the percentage was highest in the North Central States. The same was true of debt burdens for sewer projects; for water projects debt burdens were again lowest in the South.

Variation in Project Characteristics by Community Income

One objective of FmHA's loan-grant program is to help communities in need obtain adequate water and sewer facilities at a cost that these communities can afford. Need can be assessed on the basis of a number of criteria. One criterion is the present source of water in the community. If the water provided is unsafe or inadequate then this community needs a water system. A second criterion is the set of alternatives available to the community to improve its water or sewer system. Depending on the terrain and population density, a central system may or

Table 7—Characteristics of FmHA-funded water and sewer projects, by region, fiscal 1978

Project characteristic	Region			
	Northeast <u>1/</u>	North Central <u>2/</u>	South <u>3/</u>	West <u>4/</u>
Number of projects	30	81	170	46
Total grant funds (\$)	12,021,996	26,445,508	48,861,797	13,401,621
Total loan funds (\$)	27,786,574	31,632,891	64,628,672	15,342,496
Average grant size (\$)	400,735	326,487	287,422	291,340
Average grant per user (\$)	934	1,449	689	1,311
Average loan size (\$)	926,219	390,529	380,168	333,532
Average loan per user (\$)	1,537	1,557	781	1,558
Average cost per user (\$)	171	195	131	199
Average debt per user (\$)	88	95	47	85
Average grant as percent of eligible cost	25.7	40.6	42.5	42.5
Average grant as percent of total FmHA funding	33.9	48.0	45.3	49.2
Average debt as percent of user cost	51.7	48.6	36.0	42.6
Average income (\$)	8,860	7,810	5,644	7,825

Continued

Table 7—Characteristics of FmHA-funded water and sewer projects, by region, fiscal 1978--(continued)

Project characteristic	Region			
	Northeast <u>1/</u>	North Central <u>2/</u>	South <u>3/</u>	West <u>4/</u>
Average debt as: percent of in- come	1.11	1.28	0.86	1.14
Average user cost as percent: of income	2.0	2.6	2.4	2.5
Average number of benefited users (hookups):	689	311	565	342

1/ Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont.

2/ Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin.

3/ Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Texas, Tennessee, Virginia, West Virginia,

4/ Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

Table 8—Characteristics of FmHA-funded water projects,
by region, fiscal 1978

Project characteristic	Region			
	Northeast	North Central	South	West
Number of projects	7	45	155	40
Total grant funds (\$)	1,445,000	15,868,700	41,721,797	12,761,098
Total loan funds (\$)	2,015,221	19,634,500	57,406,992	14,334,898
Average grant size (\$)	206,428	352,638	269,173	319,027
Average grant per user (\$)	911	1,505	654	1,370
Average loan size (\$)	287,889	436,322	370,368	358,372
Average loan per user (\$)	1,171	1,643	748	1,583
Average cost per user (\$)	139	228	133	206
Average debt per user (\$)	72	97	45	85
Average grant as percent of eligible cost	45.8	45.9	43.2	44.2
Average grant as percent of total FmHA funding	42.3	49.5	45.4	49.5
Average debt as percent of user cost	51.95	42.42	33.89	41.41
Average income (\$)	8,113	7,737	5,621	7,768

Continued

Table 8--Characteristics of FmHA-funded water projects,
by region, fiscal 1978--Continued

Project characteristic	Region			
	Northeast	North Central	South	West
Average debt as percent of in- come	0.91	1.42	0.83	1.15
Average user cost as percent of income	1.73	3.18	2.48	2.59
Average number of benefited users (hookups):	242	375	580	363

Table 9—Characteristics of FmHA-funded sewer projects,
by region, fiscal 1978

Project characteristic	Region			
	Northeast <u>1/</u>	North Central <u>2/</u>	South <u>3/</u>	West <u>4/</u>
Number of projects	23	36	15	6
Total grant funds (\$)	10,576,996	10,576,808	7,139,996	640,525
Total loan funds (\$)	25,771,355	11,998,387	7,221,680	1,007,600
Average grant size (\$)	459,869	293,800	476,000	106,754
Average grant per user (\$)	940	1,379	1,042	921
Average loan size (\$)	1,120	333	481	168
Average loan per user (\$)	1,649	1,448	1,120	1,390
Average cost per user (\$)	181	154	114	156
Average debt per user (\$)	93	87	66	78
Average grant as percent of eligible cost	19.5	33.9	35.5	30.7
Average grant as percent of total FmHA funding	31.4	46.1	45.1	47.1
Average debt as percent of user cost	51.6	56.4	58.2	50.1
Average income (\$)	9,087	7,901	5,880	8,204

Continued

Table 9—Characteristics of FmHA-funded sewer projects,
by region, fiscal 1978—(continued)

Project characteristic	Region			
	Northeast <u>1/</u>	North Central <u>2/</u>	South <u>3/</u>	West <u>4/</u>
Average debt as: percent of in- come	0.91	1.42	0.83	1.15
Average user cost as percent: of income	1.73	3.18	2.48	2.59
Average number of benefited users (hookups):	242	375	580	363

may not be appropriate. Moreover, a community needing a new or improved system may not need, or desire, outside financial assistance; increased user charges, revenue bonds, or general obligation bonds might be sufficient. A third criterion is income; generally communities with lower incomes will find it harder to construct and maintain an adequate system without some financial assistance. Also, communities with already high tax and charge burdens relative to income will find it harder to support the additional costs of financing a water or sewer system. Finally, construction costs vary from area to area because terrain, climate, and the price of inputs vary. Thus communities similar in the first three aspects do not necessarily need the same degree of financial support; a project in a hilly area, for example, needs a grant more than a project in a flat area, all other needs being equal.

This section of the study focuses on one aspect of need--income--and examines the distribution of loans and grants by income category and whether the grant-loan splits chosen for funded projects enable the communities to obtain water and sewer services at a reasonable cost relative to income. For this purpose, FmHA's decision to fund a project is taken as given. In addition, the distribution of grants within the entire group of communities that applied for grants in fiscal 1978 is not considered, nor are the characteristics of the entire universe of FmHA-funded projects. The only cost considered is the direct user charge, since FmHA uses this cost measure in its grant and loan determination process. However, user charges are not necessarily the only costs related to the water or sewer system. Other costs might include hookup charges and special assessments or property taxes to support the water system. In addition, citizens pay taxes and fees to support other municipal services. Since user charges are only one component of the total tax and charge burden, a consideration of these additional costs could modify the results of the analysis based on only user charges and income.

Table 10 shows the distribution of grant funds by income category. Less than one third (29.3 percent) of the grant funds went to the poorest funded communities--those with median family incomes of less than \$6,000 in 1970. Over one third of the projects (36.1 percent) were located in these communities, however. One third of the grant funds went to the 26 percent of the projects located in the wealthiest funded communities--those with median family incomes greater than \$8,000 in 1970. The very wealthiest communities, receiving funding--communities with median family incomes greater than \$10,000 in 1970--received 4 percent of the funds and accounted for 4 percent of the projects.

Table 10—Distribution of grant funding by median family income of community, fiscal 1978

Median family income	Projects	Total grant funds	Percent of grant funds	Cumulative percent of grant funds
Dollars	Number	Dollars	Percent	
2,000 - 4,000	19	4,865,387	4.83	4.83
4,001 - 6,000	99	24,687,927	24.51	29.34
6,001 - 8,000	123	36,926,322	36.66	66.00
8,001 -10,000	72	30,684,312	30.46	96.46
10,001 and up	14	3,567,004	3.54	100.00
Totals	327	100,731,042	100.00	100.00

A comparison of the 1978 distribution with that found in an earlier study by the National Demonstration Water Project (NDWP) indicates that the distribution of grant funds by income category has shifted (3). In a study of all projects funded in fiscal 1976, NDWP found that the poorest communities given funding received 31.3 percent of the grant funds and contained 42 percent of the funded projects (table 11). The percentage of grant funds going to poorest communities receiving funding--communities with median family incomes less than \$4,000--increased slightly from 3.7 percent in fiscal 1976 to 4.8 percent in fiscal 1978. In fiscal 1976, the 21 percent of the projects in the wealthiest funded communities received about one-third of the grant funds. The percentage of grant funds going to the very wealthiest funded communities--those with median family incomes greater than \$10,000--decreased from 8.4 to 3.5 percent between 1976 and 1978. Table 12 shows a similar breakdown for loan funds. The poorest communities funded received about 2.4 percent of the loan funds. Assuming that these communities are less able to afford loan repayments, the skewing of loan funds, more so than grant funds, to the wealthier communities funded is proper.

The percentage of funded communities with median family income of less than \$6,000--36 percent--exceeds the percentage of rural counties with median family income of less than \$6,000, however. Only 4 percent of all rural counties fell in this category in 1970. Conversely, although median family income was \$8,000 or greater in 70 percent of all rural counties in 1970, only 26 percent of the funded communities fell in this income range. Although all data on income are prone to error, and median family incomes by community and county are not completely comparable, these figures suggest that decisions on which projects to fund have favored lower income communi-

ties. These figures say nothing about whether these funds reduced costs to a reasonable amount relative to income, however.

Table 11--Distribution of grant funding and projects, by median family income of community, fiscal 1976 and 1978

Median family income	Fiscal 1976 <u>1/</u>		Fiscal 1978	
	Projects	Percent of grant funds	Projects	Percent of grant funds
<u>Dollars</u>	<u>Number</u>	<u>Dollars</u>	<u>Percent</u>	
2,000 - 4,000	43	3.66	19	4.83
4,001 - 6,000	230	27.70	99	24.51
6,001 - 8,000	241	35.91	123	36.66
8,001 -10,000	107	24.33	72	30.46
10,001 and up	29	8.40	14	3.54

1/ 1976 data are taken from a study by the National Demonstration Water Project (2).

Table 12--Distribution of loan funding, by median family income of community, fiscal 1978.

Median family income	Projects	Total grant funds	Percent of grant funds	Cumulative percent of grant funds
<u>Dollars</u>	<u>Number</u>	<u>Dollars</u>	<u>Percent</u>	
2,000 - 4,000	19	4,725,395	3.39	3.39
4,001 - 6,000	99	28,454,283	20.41	23.80
6,001 - 8,000	123	52,451,874	37.63	61.43
8,001 -10,000	72	48,287,520	34.64	96.07
10,001 and up	14	5,471,466	3.93	100.00
Totals	327	139,390,617	100.00	100.00

To examine this issue, project characteristics are averaged by income category (table 13). For water and sewer projects combined, the largest average grants and loans, both total and per capita, went to communities in the \$8-10,000 income category, although grants funded more of the eligible costs in lower income communities. User charges were positively related to wealth, a desirable result. As a percent of income, however, user charges were inversely correlated with income; compared to users in the wealthiest communities receiving funding, users in the poorest funded communities spent twice as much of their income on user charges (3.4 versus 1.8 percent). Similarly, users in these poorest communities spent well over one percent of their income on debt service, while users in the richest communities spent well under one percent. These figures are the reverse of what they should be based on income or ability-to-pay. The pattern is the same for water projects considered alone (table 14) and for sewer projects alone (table 15), except that in the case of sewer projects, the heaviest debt and user cost burdens occur in the communities with incomes of \$4,000 to \$6,000.

To determine if these differences between lower income and higher income communities were due merely to chance or in fact reflect true differences in the underlying population, a T-test was used. The sample was divided into two groups, communities with income less than \$6,000 and communities with income greater than \$6,000. For each of these subpopulations (211 communities with income greater than \$6,000 and 116 communities with income less than \$6,000), the mean cost per user, grant per user, loan per user, debt service as a percent of income, grant as a percent of eligible cost, and grant as a percent of total FmHA funding was calculated. The null hypothesis, that the sample means are the same for each of these characteristics was rejected at the 5 percent level of significance for all characteristics except debt service as a fraction of income (table 16). In other words, the mean values of debt service as a percent of income are not significantly different in the two subpopulations. Thus, FmHA's program may in fact be equalizing debt burdens better than this sample of projects suggests.

Total user costs, moreover, were significantly lower in the poorer communities. However, total user costs as a fraction of income were significantly higher in the poorer communities, meaning that communities that could least afford it paid higher user charges relative to income. Per user grants and loans and debt service as a fraction of user charge were all significantly higher for the wealthiest of the funded communities, while the grant as a fraction of eligible cost was significantly lower in these communities. Two related conclusions may be drawn from

Table 13--Characteristics of FmHA-funded water and sewer projects, averaged by income category, fiscal 1978

Project characteristic	Income				
	\$2000-4000	\$4001-6000	\$6001-8000	\$8001-10,000	\$10,001 & up
	<u>Dollars</u>				
Total grant	256,073	249,373	300,214	426,171	254,786
Grant per user	868	777	1,033	1,237	954
Total loan	248,705	287,417	426,438	670,660	390,819
Loan per user	779	801	1,192	1,666	1,143
Cost per user	117	136	163	195	191
Debt per user	47	47	71	94	76
	<u>Percent</u>				
Grant as percent of eligible cost	49.4	42.8	40.7	34.9	38.9
Grant as percent of total FmHA funding	52.0	47.1	45.3	42.6	41.9
Debt service as percent of user cost	40.55	34.35	43.69	48.25	39.67
Debt service as percent of income	1.37	0.94	1.02	1.14	0.65
User cost as percent of income	3.43	2.68	2.35	2.21	1.78
	<u>Hookups</u>				
Number of benefited users	557	435	460	553	570

Table 14—Characteristics of FmHA-funded water projects,
averaged by income category, fiscal 1978

Project characteristic	Income				
	\$2000-4000	\$4001-6000	\$6001-8000	\$8001-10,000	\$10,001 & up
	<u>Dollars</u>				
Total grant	263,494	251,132	296,137	384,419	292,885
Grant per user	864	741	1,001	1,210	1,128
Total loan	257,716	291,456	442,416	498,182	272,628
Loan per user	785	765	1,147	1,659	1,100
Cost per user	119	138	168	216	229
Debt per user	48	44	68	91	69
	<u>Percent</u>				
Grant as percent of eligible cost	48.8	44.0	42.9	42.8	50.7
Grant as percent of total FmHA funding	51.6	47.5	46.0	43.3	51.1
Debt service as percent of user cost	40.08	31.81	40.26	41.99	30.16
Debt service as percent of income	1.39	0.90	0.99	1.1	0.61
User cost as per- cent of income	3.51	2.72	2.43	2.43	2.16
	<u>Hookups</u>				
Number of bene- fited users	560	459	509	563	343

Table 15—Characteristics of FmHA-funded sewer projects,
averaged by income category, fiscal 1978

Project characteristic	Income				
	\$2000-4000	\$4001-6000	\$6001-8000	\$8001-10,000	\$10,001 & up
	<u>Dollars</u>				
Total grant	122,500	233,710	314,708	470,308	216,686
Grant per user	942	1,091	1,144	1,264	780
Total loan	86,500	251,466	369,629	852,994	509,100
Loan per user	665	1,118	1,352	1,673	1,185
Cost per user	80	118	147	174	154
Debt per user	39	67	82	97	76
	<u>Percent</u>				
Grant as percent of eligible cost	58.5	32.2	32.8	26.6	27.1
Grant as percent of total FmHA funding	58.6	42.7	42.9	41.9	32.8
Debt service as percent of user cost	49.02	56.97	55.89	54.86	49.18
Debt service as percent of income	1.03	1.31	1.14	1.19	0.69
User cost as per- cent of income	2.12	2.36	2.06	1.98	1.40
	<u>Hookups</u>				
Number of bene- fited users	130	223	285	541	798

Table 16—T-test for significant differences in selected project characteristics in poor and wealthy communities, fiscal 1978 1/

Project characteristic	: Group 1 mean <u>2/</u>	: Group 2 mean	: T-value	: d.f.
Cost per user (\$)	176	133	50.7**	325
Grant per user (\$)	1,095	791	3.16**	325
Loan per user (\$)	1,347	796	5.20**	325
Debt service as percent of income	1.04	1.06	0.21	325
Debt service as percent of user cost	44.9	35.2	3.76**	325
User cost as percent of income	2.3	2.8	-3.63**	325
Grant as percent of eligible cost	38.6	43.9	-3.44**	325
Grant as percent of total FmHA funds	44.2	47.8	-1.92*	325

1/ The t-test was performed as follows: First an f-test was used to determine if the variances in the two subpopulations were significantly different. If so, the t-statistic based on a separate variance estimate was used; if not, the t-statistic based on a pooled variance estimate was used.

2/ Group 1 consists of communities whose median family income is greater than \$6,000, group 2 consists of communities whose median family income is less than \$6,000.

** indicates t-statistic is significant at the .05 level, using a two-tailed test.

* indicates t-statistic is significant at the .10 level, using a two-tailed test.

these findings. Debt burdens relative to income in the low income communities are not significantly higher than those in the wealthier communities because grants as a fraction of total FmHA funding and eligible cost are higher in lower income communities. Total user charges, which include both debt service and operating and maintenance costs are higher relative to income, however. This suggests that these communities may nonetheless not be obtaining water or sewer services at a reasonable cost relative to income or relative to wealthier communities.

Although debt burdens average one percent of income, actual debt burdens are higher in many cases. Criteria other than the "one percent" rule partially account for these cases. In particular, the "similar system" guideline states that a grant should result in a "reasonable" user charge. A "reasonable" rate "is defined as that which is not less than existing prevailing rates in communities being served by an established system constructed at similar ...cost having similar economic conditions" (5, Section 1823.472). This "similar" system or "comparability" provision helps measure the efficiency of the proposed system and helps FmHA direct resources to those areas where the greatest number of people can be helped for the fewest dollars. The provision also assures that communities contribute to their own services in some minimum proportion to costs.

However, the comparability provision also sets an allowable range of user charges regardless of income. Since the comparability provision takes precedence over the debt burden criterion, the comparability provision can work against the debt burden criterion. In other words, if a grant calculated to result in a debt burden of one percent of income also results in a user charge less than that of a "similar" system, then the grant is lowered until a "similar" user charge results. This means, however, that the debt burden increases. Although this adjustment does not occur in all cases, it does appear to affect a significant number of grants.

Two changes in FmHA's criteria since this study was conducted may help prevent cases of very high debt burden and make total user charges more equitable relative to income. First, effective in fiscal 1979, the maximum grant percentage became 75 percent of eligible cost. Second, effective in mid fiscal 1978, the debt guideline ranges from 0.75 percent to 1.25 percent of income. The percent equals 0.75 if median family income is less than \$6,000; the percent equals 1.25 if median family income is greater than \$10,000. Nonetheless, the similar system rule remains. More equitable user charges could be achieved by changing the split of grant and loan funding in each community,

so that poorer communities receive more grants relative to loans than do wealthier communities. Such a reallocation of funds could be achieved without changing the total financial commitment to each community and without increasing total grant and loan funds.

CONCLUSION

FmHA's program of grants and loans for water and waste water disposal facilities in rural areas has provided \$1.66 billion in grant funds and well over \$5 billion in low interest loans to rural communities since 1966. During this period, grant obligations per year have increased to nearly 16 times their 1966 level. In contrast, loan obligations have increased about eight-fold.

Characteristics of a random sample of about one third of the projects funded in fiscal 1978 were studied. Loans and grants ranged from \$4,000 to close to \$1 million; system size ranged from as few as 14 to as many as 5,400 hookups. The majority of the systems were in the South and about 90 percent of the grant funds and 93 percent of the loan funds went to communities with median family incomes of between \$4,000 and \$10,000.

In addition to describing system characteristics, the data are used to determine whether the split between grant and loan funding helped reduce debt burden and user charges to a reasonable level relative to income.

On average that split did not fully equalize water or sewer service costs relative to income. Rather, user charges as a fraction of income were higher in poorer communities. Equity based on ability-to-pay has not been achieved even though the grant-loan program has enabled communities to build otherwise unaffordable water or sewer systems. However, the grant-loan split did result in debt costs which averaged one percent of income in fiscal 1978. The data do not support a hypothesis that debt costs relative to income were greater on average in poorer communities. Despite the favorable average, there are cases of much higher debt burden. Some of the other criteria used in deciding the relative grant and loan size help account for these deviations.



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